Notebook, N-99-11-29

This notebook covers the period November 1899-March 1900. Most of the entries are by an unidentified experimenter, but many of them contain comments by Edison. At the beginning of the book is a series of magnetic separation experiments dealing mainly with ore from the Dunderland region in Norway. The remainder of the book contains notes relating to iron ore briquetting experiments. The front cover is labeled "Dunderland & Experiments." The spine is labeled "12." The pages are unnumbered. Approximately 30 pages have been used.

Only the separation experiments, which contain the Edison comments, have been selected. Transcriptions of some of the rough entries in this book can be found in Cat. 999, Edison Ore Milling Syndicate Records (Company Records Series).

Nov. 29th 1899.

Made experiments with new Magnet machine in Machine Shop. Used bag marked V of Norway ore. Sized out; Ten thru .007 between .007 and .009 and below .009 and .029.

Mr Edison wishing to see how good a Concentrate we could make. Samples were sent to Shock to Assay for Fe. He reports stuff between .009 & .029 Con. 67% Fe, Tailings 19%.

Stuff ~~under~~ between .007 and .009 Con. 62%. Tailings 14%.

Less thru .007 Con 63% Tailings .21%.

This is not very good results.

Have now taken Machine over in outside room of Chemical building. And have tried different kinds of feeds and speeds.

The best results seem to be obtained when feed is allowed to fall in a narrow stream between the poles of Magnet, this is better

Then a broad feed or one separator
into two streams on either side of
magnet. Have fitted up a cone
so as to break up the ore as it
passed over magnet. This work,
A.H. makes cleaner concentrate

Exp. I Sample P.
Con. 45.6 %
Tailings 37.5 %
Fine Tailings 10 % blown
Low magnetite 1 %
Lost 1.6 %
The fine tailings in the above
contains at least 30% Fe_2O_3
will only take out very fine dust here
after by air

Have been experimenting a little
with different samples, find
that some contain heavy all
magnetite other about half and
half, and other only two or three
% of magnetite, the rest of
the iron being hematite. Will
start at A and go through all
of samples.

Experiment on Norway Ore.

Hematite Machine

Sample A Contains 32.66 % of Fe. (Shoots)
Crushed to .012 total weight 650 grains blown out of air 2½ % as dust.
The 650 grammes after crushing had following percentage

Magnetite	0.	
Hematite	46 %	Oxide
Tailings	51 %	
Dust	2½ %	

The above sample separates easily, there being no pieces of quartz with Hematite sticking to it. Made assay for P. on dry out .018 Sent Sample to Mr Cockalt to assay for Fe & P. He reports 66.3 Fe. P. .018
Run over 7 times — 6 times to make iron once to run concentrate

Sample B. after running
Crushed to .012

Magnetite	9 %	Oxide
Hematite	44 %	
Tailings	37½ %	
Dust	4	
Miscarriages	3½ %	

This sample was worse to separate than A. had to run

In this run the deflected stream had a partition board put in to cut the stream of magnetic stuff. The least magnetic was low grade magnetite this was thrown out,

it over Machine 12 times
6 times to make Concentrate
3 times to get Magnetite with
6 10 and 15 Amps (Sec Volt 4 Amp Rang)
3 times to get Slides a little
less Magnetite than Hematite
this was done with 44 Amps

Sample C. (33.98 Fe. Shock)
Cambot separate on Magnetite Machine
Contains about 30% Magnetite
It nearly all Magnetic,

Sample D. (30.53 Fe. Shock)
Contains 30.4 Fe in Magnetite
only separated on Belt M — Balance

Sample E. 26%. Fe Shock,
25% Fe in Magnetite Balance
only separated on Belt M—

Sample F. 17%. Fe, in
Magnetite.
Tried this sample on
Magnetite machine but did not
get any good results owing
to Mudworps. This is one of
the bad samples, and in practice

I do not think it would pay to separate the Hematite out of the Magnetite tailings.
Look out for Amber ice —

Sample G. (44.60 % Fe Shock)
43.4 % Fe in Magnetite. Ballo
no Hematite. all magnetic

Sample H. (41.94 % Fe. Shock)
I get: 34.2 Fe. in Magnetite
very little Hematite. a magnetite

Sample I. (34.24 Fe. Shock)
20.2 % of this iron is in Magnetite. Cannot separate Hematite. this would make a loss of 14 % in tailing. this sample may have been taken from surface and weathered out of tailings that way.

all foregoing are from Ubiro and Dykes

The Ubiro and deposits would give an average of 8% Fe in in Magnetite tailings, ~~of Hematite~~ ~~about~~ 27% Fe in Magnetite could be got with bad Magnetite the 8% in Hematite could not be got owing to Magnetite Mixing.

Sample K. (35.84% Fe Shock)

This is one of the fine samples for ~~Magnet~~ Magnetic Machine as it our Conditions 1% Magnetite can make a splendid separation in 7 runs. by making a good Concentrate each time. Cannot see any quartz in Concentrate under Microscope. Crushed to 1012.

Sample L

Contains 14.4 Fe in Magnetite Shock reports 32.39% Fe total one of the bad samples. but seems to work fairly good, could work it in practice Q.K.

Will have to blow dust out in Nonway Mill to get machine to work well.

Sample M (34.52 F Shock)
Contains 4.3 %, in Magnetite
This and the last two samples are from the Vestraald deposit
And are O.K. for the Magnetic Machine
Can be separated with a Magnetic running at the rate of 600 lbs. per ~~[illegible]~~ hour, per present Machine. This is done by blowing all of the stuff smaller than about .003 out by air, this contains very little iron, 6 runs makes good tailing & concentrate.
Rerun the concentrate once to get stuff that is more magnetic than Hematite, and once to get stuff that is less magnetic.

Sample N.
Contains 18.3 % Fe in Magnetite and is O.K. for Magnetic Machine

Samples. C. P. R. S T U and X are all O.K. for Magnetic Machine and can be separated first rate with not more than 9 magnets at most, in fact 8 seems to be all that is required. 6 ream to make concentrate with 85 volts and 4 Amperes and then to take this samples one run with 20 lamps. 67 volts. 3.3 Amp. to each stuff that is a little less magnetic than Hematite and other with 45 lamps. 85 volts. 4 Amp. to each stuff that is a little more magnetic the Hematite

Samples V and Z are from another deposit and difficult to separate V contains 38.49 % in Fe 17.2 % of it being in Magnetite Z contains 39.83 in Fe. 15.8 % of it being in Magnetite.

Have mixed up all of the samples in bags crushed and screened to .012 going to make magnetite and hematite briquettes to send to London.

Look out magnetite on belt machine in seven Runs.

I find that I have an enormous amount of Mugwumps from ~~the~~ samples that contain about half magnetite and half Hematite; will have difficulty in making a good concentrate I am afraid to ~~[illegible]~~

1st Run was made with 8 lamps on board. 44.7 volts 2.2 Amp.

2 Run with 15 lamps. 61 volts. 2.8 Amp.

3 Run. 20 lamps. 67.6 volts 3.3 Amp. This seems to Chalcet all the Mugwumps or half grade stuff between magnetite & Hematite

used deflecting board to cut stream

Will object of catching strongly magnetic Mugwumps & get rid of as they clog the Hematite Machine

They are not magnetic enough for Belt Machine & too magnetic for Belt Machine

Next made 7 runs with 40 amps. 84 volts. 3.88 Amp. This makes good Tailings.

Rerun the Concentrate 3 times with 40 amps 84 volts 3.88 amp. the Concentrate now looks good, made assay for P. my self (Short-Mellwock) Got .034 ~~[illegible] .033 P.~~

The magnetite should go about 67 % Fe I think, and the Hematite in the briquettes between 65 and 66 %, Fe.

Have heard that Hematite briquettes only went 63.94 % Fe and .05 P. in London

Have mixed and crushed up all of Samples sent in sack found from Dundreland.
Crushed. to .009.
Took out Magnetite in Seven Runs on belt Machine #1
Small bottle is a sample.
Took out wood Mugwumps with 10 Camps (Sample bottle #2.) on Howard's Mag.
Made Seven runs with 40 Camp 84 Volts 3.88 Amp.

1st Run. took out	3.6	%
2nd " " "	5	%
3rd " " "	4.3	%
4th " " "	3.9	%
5th " " "	3	%
6th " " "	2.2	%
7th " " "	1	%
Total.	23.	%
this Concentrate from the 7 runs	48	% Fe.

#3 bottle is a sample.
#4 bottle is a sample of tailing made ~~after~~ in the 7 runs.

Reran 46% Concentrate. 3 times
45 Amps 85 volts. 4 Amp;
59 % Fe. Bottle #5 is Sample
of Concentrate and. #6 is
Sample of tailings
Made ~~other~~ ~~later~~ runs with
25 Amps on to calcte portion
of Quinamany less Magnetic
than Hematite, ~~Sort out~~
tailings in bottle. #7.
~~Concentrate in bottle #8~~
Ground Concentrates to .007
and ran twice. Concentrate
in big bottle is results.

Franklin's Experiments

A mixture of Franklinite and garnet ore sent from Franklin Furnace separated easily on Hematite machine. The Franklinite is a good deal more magnetic than spinel Norway ore. And a proper separation was made in 6 seconds at rate of 600 lb per H.

1st Run. was with 8 lamps on board. 44.7 volts. 2.2 amp.

2nd Run. 61 volts. 2.8 amp. 15 lamps.

3rd Run, 67.6 volts 3.3 amp 20 lamps.

4 Run. 78 volts. 3.53 amp. 30 lamps.

5 Run. 84 volts. 3.88 amp. 40 lamps.

6 Run. 85 volts - 4 amp. 45 lamps.

There is a good deal of difference in the magnetic strength of the Franklinite. Had I used enough power to the first run to deflect say the strip I took out in the 5th run. Then the strip that 10 and 15 amps would deflect would have blocked the magnet with 40 amps. Hence the reason for using a weak magnet first with stronger each run. The poles of magnet were 1¼ apart to. At the end of the above Franklinite. Six runs the poles of magnet were put ½" apart and the garnet ore was taken out in other six runs with 45 amps 85 volts 4 amps. The ore was crushed to .023. The Franklinite breaks out of the calcite clean and is easy to separate the garnet is more difficult deflect. Will a great deal other magnetics than the Franklin